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New Upper Carboniferous Palaeodictyopteran Insect From Piedra Shotle Formation, Argentina

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Abstract — A new Palaeodictyopteran insect *Breyeria brauckmanni* from Piedra Shotle Formation, Argentina is described. It belongs to the family Breyeriidae that is attributed to the Carboniferous in North America, Europe and Asia. This fact in connection with the age of the entomofauna and arachnofauna of the Bajo de Veliz Formation that overlies Piedra Shotle Formation, which also is Carboniferous in age, permit to attribute an Upper Carboniferous one for this formation in discordance to the Lower Permian age given to it by Argentinean Palaeobotanists.

Resumo — É descrito um novo inseto da Ordem Palaeodictyoptera, *Breyeria brauckmanni*, proveniente da Formação Piedra Shotle, Argentina. Pertence à Família Breyeriidae, de idade carbonífera nos Estados Unidos da América do Norte, Europa e Ásia. Este fato associado à idade carbonífera da entomofauna e arachnofauna da Formação Bajo de Veliz, sobreposta à Formação Piedra Shotle, permite atribuir a esta formação idade Carbonífero Superior, em discordância com a idade Permiano Inferior, atribuída por paleobotânicos argentinos.

INTRODUCTION

The material under study was kindly provided by Professor Sergio Archangelsky. This material is very important because the presence of insect wings associated with plants. These insects are of exclusively Carboniferous age in several European countries, in the United States of America and in Asia; and on the other hand, the associated taphoflora has a Lower Permian age attributed by some Argentinean Palaeobotanists.

Repository — Museo de Ciencias Naturales, Sector de Paleobotanica, one slab nº BA Pb 637.

GEOGRAPHICAL AND STRATIGRAPHICAL DATA

The insect wing imprint comes from the Bed A of the Profile NFC, La Casilda Section, located at the left margin of the Arroyo Genoa, 3 km North of Piedra Shotle, Chubut, Argentina. The Bed A is 40 cm of a fine laminated light olive grey sediment limited below and above by a coal bed. It contains abundant plant remains which are: *Paranocladus, Eucerospermum, Aphlebia, Pecopteris, Sphenopteris, Phyllotheca*, fructifications and other indeterminated plant remains. The predominant genus is *Paranocladus* with 41.70% frequence. The age is "provisorily Lower Permian". (Archangelsky, 1981). From the coal bed below the bed A were collected the following palinomorphs, according to Gamerro and Archangelsky, 1981: *Punctatisporites gretensis* Balme & Hennely, *Lundbladispora braziliensis* (Pant & Srivastava), *Cristatisporites* cf. *lestai* Archangelsky & Gamerro. The dominant spores are: *Cristatisporites* and *Lundbladispora* associated with rare remains of *Gangamopteris*. The age attributed for this material is Permian.

TAXONOMY

Ordo Palaeodictyoptera
Familia Breyeriidae Handlirsch, 1906
Sub Familia Breyeriinae Laurentiaux & Laurentiaux-Vieira, 1951

Breyeria de Borre, 1875

Wings of large size, broad, equal in length, the hind pair broader, Sc short or long, stems of R and M approaching or touching near the bases. Branches of main veins few, widely separated from each other; MP and CuA simple, MP forked, CuP usually forked. Hind wing often broadly triangular in shape. Cross-veins numerous, thin, irregular, often connected by anastomoses. Clusters of long hairs on the anterior and posterior margins of the membrane are seen in some species.

Type species: *Pachytylopsis borinensis* de Borre, 1875.

Breyeria brauckmanni Pinto sp. nov.
Figures 1 and 2

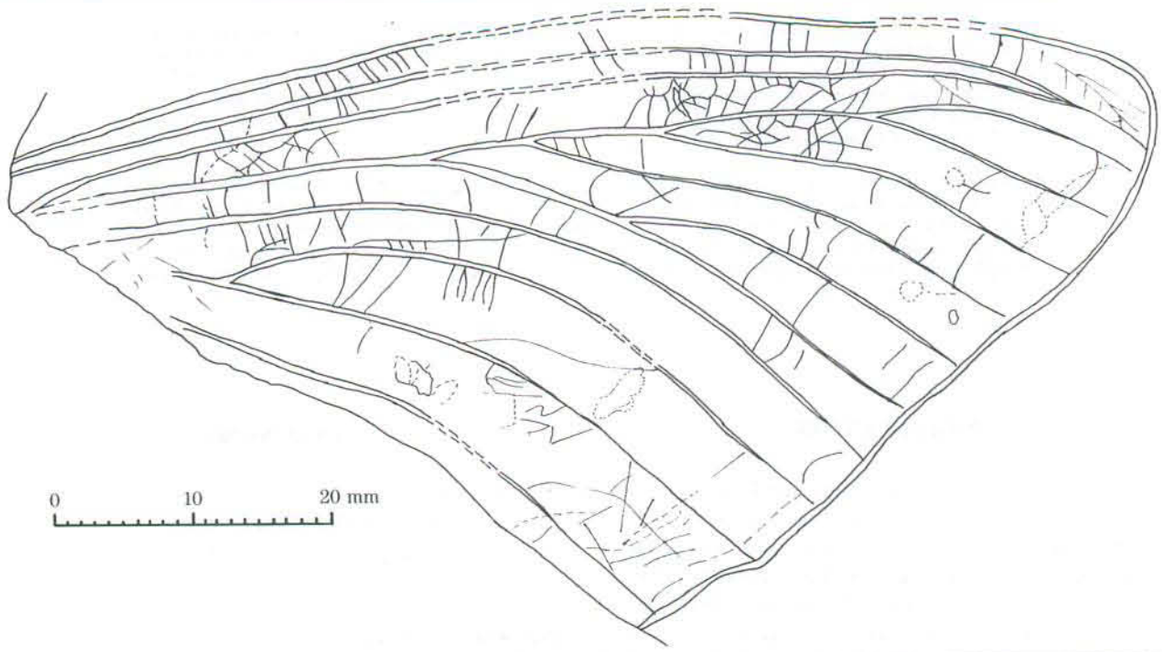
Designatio nominis: in honour to Dr Carsten Brauckmann.
Holotypus: one hind wing imprint, Mus. Ci. Nat. nº BA, Pb 637.
Locus typicus: La Casilda Section, Profile NFC, Bed A, Chubut, Argentina.

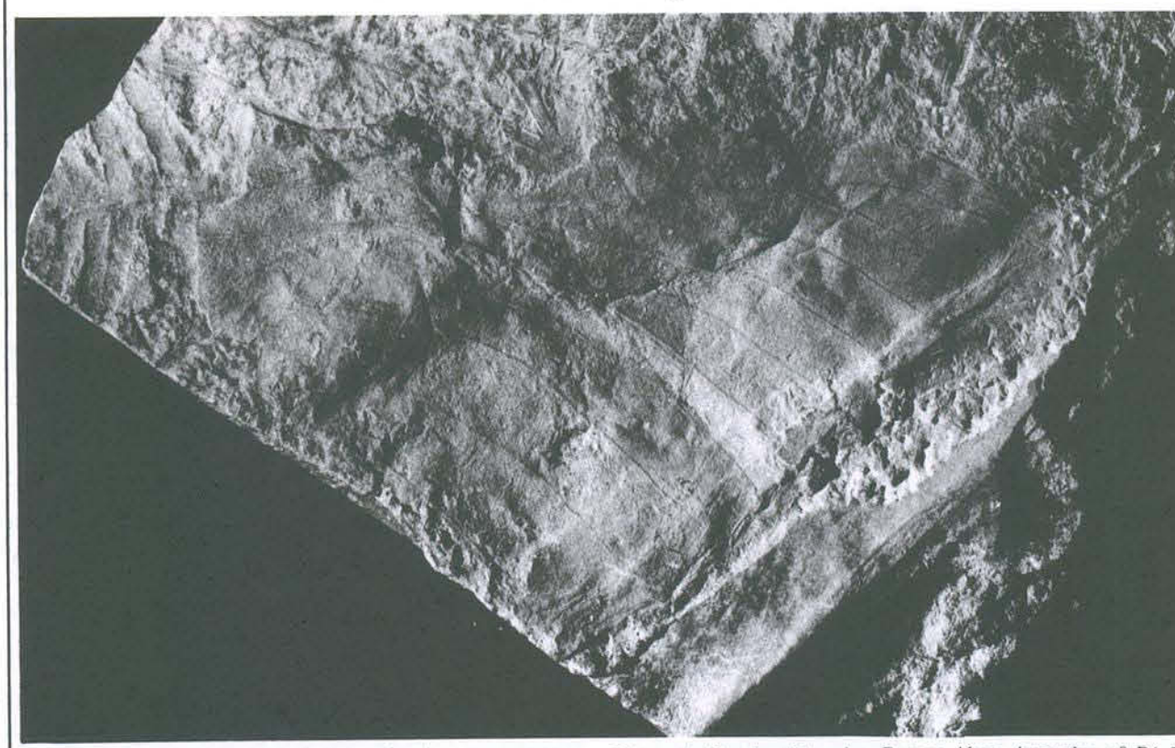
Diagnosis — Triangular hind wing, with more than 80.0 mm long, 40.0 mm wide; Sc very long fusing with R at almost the apex of the wing; RS with four branches the proximal one forked, the other three single.

Description — Triangular hind wing with the

preserved part 80.0 mm long and 40.0 mm wide. Anterior margin slightly convex, **Sc** vein parallel to **C** one and separated from it by straight cross-veins; **R** runs parallel and close to **Sc**, separated from it by straight cross-veins also; **Rs** originated at the base of **R** runs almost straight, curving backward at the apex and leaving a broader space between it and **R** specially at the midlength of the wing. This space is covered by anastomosed faible cross-veins forming a network. **Rs** has four branches, the proximal one is bifurcated, **MA** is single, **MP** with two long branches, **CuA** apparently single. Irregular faible cross-veins cover all the space between **Rs**, **M** and **CuA**.

Remarks — The new species can be differenciated from all other species of the family, except from *B. borinensis* Handlirsch, 1906 and *B. guttata* (Zalessky, 1931), by the long **Sc** which reaches almost the appex of the wing. Laurentiaux & Laurentiax-Vieira (1951,





Figures 1 and 2 — *Breyeria brauckmanni* Pinto sp. nov. Holotypus Museo de Ciencias Naturales, Buenos Aires, Argentina nº BA Pb 637. Piedra Shotle Formation, Upper Carboniferous, Argentina.

p. 587), say that the drawing of *B. borinensis (in* Handlirsch, 1904, pl. III figs. 9 and 10) presents a Sc vein longer than it is really. However looking the Handlirsch's photograph at the same plate, the difference is very small. Anyway the new species has a longer Sc. The most similar species are: *Tchirkovaea guttata* Zalessky, 1931. [=*Breyeria guttata* (Zalessky, 1931)] and *Borrea lachlani* Brongniart called *Breyeria (Borrea) lachmani* Brongniart, 1893 (*in* Laurentiaux & Laurentiaux-Vieira, 1951, p. 590 fig. 4) and *Breyeria lachmani* (Brongniart) (*in* Kukalová, 1969, Part II, p. 467 fig. 40) which according to the representation made by the author has the same kind of veins disposition; but the new species differs from it in having Sc longer and Rs with one branch more. *Breyeria guttata* (represented *in* Sinitshenkova, 1979, p. 194 fig. 1) is also greatly similar specially on the long Sc vein but differs in the larger distal separation of Rs from R and by having the posterior branch of the proximal one of Rs (Mp *in* Sinitshenkova) forked and apparently much stronger cross-veins between Rs, MA, MP and CuA veins.

CONCLUSIONS

The age reached by the taphofauna does not agree with that one attributed to the taphoflora by the following reasons.

a) The world occurrence of the species of the family Breyeriidae is:

Breyeria borinensis (de Borre, 1875), Westphalian C, Belgium.

B. lachlani (Brongniart, 1893), Stephanian B, France.

B. boulei (Meunier, 1910), Stephanian B, France.

B. guttata (Zalessky, 1931), Upper Carboniferous, Siberia.

B. delruei Laurentiaux, 1949, Westphalian B, France.

B. limburgica Laurentiaux, 1950, Westphalian A, Netherlands.

B. stopai Laurentiaux & Laurentiaux-Vieira, 1951, Westphalian C, France.

B. britannica Laurentiaux & Laurentiaux-Vieira, 1951, Westphalian B, England.

B. barborae Kukalová, 1959, Namurian C, Czechoslovakia.

B. vrankeni Laurentiaux-Vieira & Laurentiaux, 1964, Westphalian B, Netherlands.

B. rappi Carpenter, 1967, Westphalian C, USA.

? B. sharovi (Sinitshenkova, 1979), Stephanian, Siberia.

? B. triramosa (Sinitshenkova, 1979), Stephanian, Siberia.

Stobbsia woodwardiana Handlirsch, 1908, Westphalian, England.

[=*Breyeria woodwardiana* (Handlirsch, 1906) *in* Bolton, 1921].

Breyerioides kliveri (Güthörl, 1934), Westphalian C, Germany.

Jugobreyeria sippelorum Brauckmann, 1985, Namurian B, Germany.

So the insect under description belongs to a family until now being exclusively of Carboniferous age.

b) Another insect under description from Piedra Shotle Formation belongs also to a group of exclusively Carboniferous occurrence.

c) Bajo de Veliz Formation overlying the Piedra Shotle Formation has a taphofauna (insects and arachnids) of exclusively Carboniferous age (Pinto & Ornellas, 1978a, b; 1980a, b; 1991; Pinto & Hünicken, 1980; Pinto, Ornellas & Purper, 1980).

Based on these facts the author concludes an Upper Carboniferous age for the Piedra Shotle Formation.

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